



**WORLD CUSTOMS ORGANIZATION**

# GUIDELINES FOR THE PURCHASE AND DEPLOYMENT OF SCANNING/IMAGING EQUIPMENT

JUNE 2009

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# GUIDELINES FOR THE PURCHASE AND DEPLOYMENT OF SCANNING/IMAGING EQUIPMENT

## I. INTRODUCTION

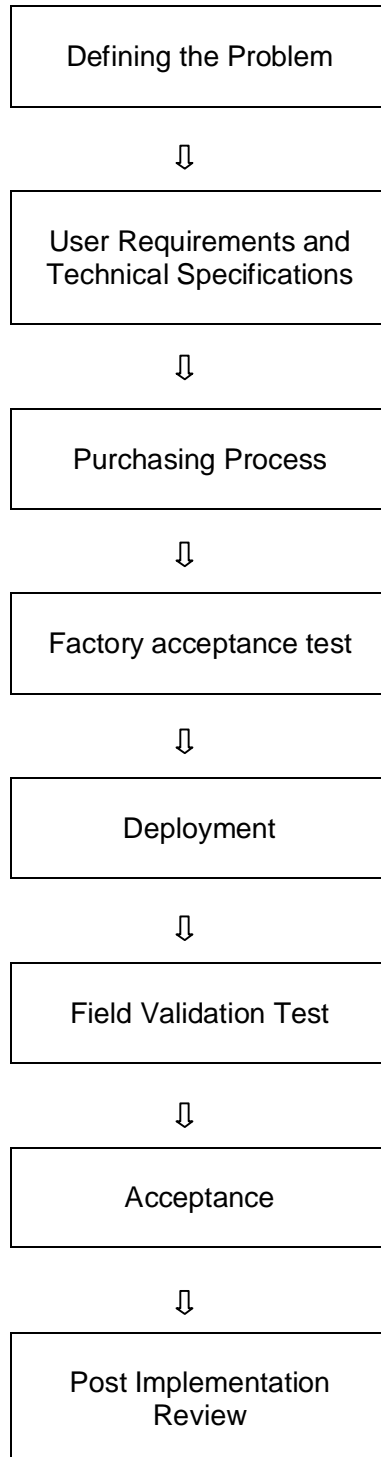
Many Members are looking at the potential for technical equipment, particularly x-ray or gamma ray equipment for scanning containers, to help meet their objectives by increasing efficiency in examinations. There is no doubt that container scanning/imaging equipment can increase the number of consignments which receive customs attention without causing undue delay, and it can identify illicit goods. But the equipment requires a large capital outlay and the process of introducing it, from conception through to operation, impacts on the whole control and intelligence sectors and may entail changes to Departmental infrastructure and procedures. To justify the outlay funding, and to ensure maximum return for the investment, it is necessary to ensure scanning/imaging equipment is used effectively and that it is fully integrated into the risk assessment regime. The experience of Customs administrations who currently use it emphasizes that planning for the equipment's introduction at an early stage is essential.

These Guidelines are designed to assist Member Administrations which are considering the purchase of container scanning/imaging equipment by detailing relevant administrative issues. Crucial to the effective deployment of this equipment is the importance of integrating the scanner into Customs controls, utilizing risk management techniques. Further, this equipment requires a proper infrastructure to ensure efficient delivery of selected containers to the scanning unit.

The scope of these Guidelines is limited to x-ray and gamma-ray imaging type equipment and does not include nuclear and other radioactive material detection equipment including radiation portal monitors; nonetheless, radioactive and special nuclear material detectors may be considered as optional extras when purchasing container scanners.

The International Atomic Energy Agency (IAEA) has produced suitable technical guidance for nuclear and other radioactive material detection equipment entitled 'Technical and Functional Specification for Border Monitoring Equipment [IAEA Nuclear Series no.1]

## ***Flowchart***



## II. DEFINING THE PROBLEM

- What is particular problem at the field level?
- What is the threat?
- Number of items needed
- Budget availability
- Consideration of priority areas for deployment of the system.

It is well known that Customs administrations are faced with increasing volumes of traffic, no corresponding increase in resources and greater expectations from Business for faster clearance times. At the same time, governments and society understandably expect Customs to provide an effective control on imports, exports and transit traffic. Global terrorist attacks have also heightened the expectations placed upon Customs administrations in respect of border security. To cope with this situation, many Members are looking at the potential for technical equipment, particularly x-ray or gamma ray equipment for scanning containers, to help meet their objectives by increasing efficiency in examinations.

Some important issues to be considered at the outset:

1. Annual operations and maintenance costs of the imaging equipment are about 15 % of the original cost of the equipment.
2. A full training schedule must be established for dedicated officers who are to work with the equipment.
3. One full time scientific/programme manager (ideally an engineer) who will be assigned full time to manage the operations, training and administration of the systems.
4. Formation of a procurement group to include: customs policy expert, radiological expert, internal technical expert, procurement expert, operational representative, financial expert, as appropriate.
5. Since systems must routinely be serviced, systems should be easily accessible to the equipment manufacturer's personnel.
6. A Radiation Safety programme should be established.

The underlying consideration is whether container scanning/imaging equipment is a justified acquisition. It should be emphasized that prior to investment in imaging equipment a full cost-benefit analysis should be conducted to determine whether or not purchase of the equipment is more beneficial than manual standard intervention.

For all administrations and all sites, the purchase cost is a constant. Potential returns will, however, vary dependent on the volume of traffic, its nature, and the assessed risk which would be addressed. For example, if the principal purpose is to control revenue, the overall value of traffic, the level of duty rates and the projected level of misdeclaration are

necessary components of the analysis. If drug interdiction is the major concern, the level of traffic from source countries is relevant.

For the most effective and efficient use of this equipment input from trade groups, port authorities and Customs administrations must be considered. It is important to address concerns of both the trade and port or border crossing operators from an early stage. Trade bodies and port authorities and other border crossing operators must be kept informed of intentions and progress and should be involved in planning to minimize delays in the flow of trade.

The effect of the deployment of the imaging equipment on trade patterns and whether traders will divert their goods to other ports or border crossings (“port shopping”) should be considered. To address this concern, it will be necessary to show through consistent application of procedures that traders wishing to avoid a port with a scanning facility will not obtain material benefits in alternative locations.

### **III. USER REQUIREMENTS and TECHNICAL SPECIFICATIONS**

Before deciding on technical specifications, the purchaser should carry out sufficient research of technology solutions which are currently available, as well as new and emerging technologies. Existing users should be consulted to identify best practice and also limitations of existing systems.

During the process of procuring imaging systems it is essential that the purchasing administration consider not only the illicit items that are being sought but also how these illicit items compare and contrast with the legitimate flow of trade. In addition, an in-depth understanding of operational constraints on deployment of a particular imaging system, e.g., availability of sufficient real estate, national radiation requirements, (a license to hold and use equipment will be required, usually involving a series of conditions), must also be taken into account. One of the most important considerations that an administration must address is which of the commercially available technologies best meet the user requirements within financial constraints.

Listed below are the specific considerations an administration must address, both in contract with a vendor and within its own operational environment, during the procurement process.

#### ***Contractual requirements to be taken into consideration:***

- Manufacturer’s production process for the imaging equipment must be ISO 9001 certified
- *Necessity for X-Ray & Gamma Ray systems to meet IAEA standards/regulations for radiation equipment*<sup>1</sup>
- Related electrical standards (national and international)
- Local health and safety requirements (e.g. shielding, exclusion zone, personnel safety programme)

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<sup>1</sup> The International Basic Safety Standards against Ionizing Radiation and for the Safety of Radiation Sources (SS115, 1996) and Safety Guide RS-G-1.10: Safety of Radiation Generators and Sealed Radioactive Sources

- National transportation standards (e.g. transport requirements) for the imaging system's transport platform and for both the relocatable and mobile versions
- Available maximum scan size of the equipment
- Minimize multiple scans of the object
- If possible, one scan on whole screen for the entire cargo. For land borders this would include the tires on the transport mode.
- Image quality
- Resolution
- Penetration
- Contrast resolution
- Throughput
- Scan speed
- Operating temperature of the equipment (minimum and maximum operational temperatures) and other environmental factors such as wind, moisture, dust
- System availability (minimum operational availability of 95-98%, not including maintenance time spent, is necessary). "Downtime" <sup>(2)</sup> tolerance rates may vary from country to country

***Additional selection criteria and initial site survey issues <sup>(3)</sup> :***

- National standards for maximum radiation exposure for operational personnel
- Prioritization of deployment
- Indoor/outdoor usage
- Available space (to include equipment with exclusion zone)
- Geological considerations
- Power availability
- Communication availability
- Regulatory concerns
- Traffic/cargo flow
- Minimal logistical impact on port operations
- Port terminal operators' involvement for site survey
- Port authority charges (i.e. rent for the land where the system is deployed, if any, could be considered as a cost element).
- Placement of systems within the facility and port; are there a proper number and properly placed traffic control choke points?
- What changes to current infrastructure required
- Planning requirements
- Environmental impact
  
- Annual cost of maintenance
  - 5%-10% of the cost of the product (not including operational costs)
  - A service contract for full maintenance is recommended, if national legislation permits
  - 10 years for spare parts availability is recommended

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<sup>2</sup> Non-availability of the equipment during operational hours

<sup>3</sup> Second site survey is to be completed at the deployment stage with the contracted vendor

- Approximately 5% cost of the product should be considered for program operations

Other costs to be taken into account: radiological license fee, radiation detection monitoring costs (dosimeters and analysis costs etc), radiation training costs, support vehicles, additional staffing costs.

### **Type of technology**

In simple terms, the essential differences between systems based on x-ray and gamma ray are:

#### a) X-Ray

An x-ray is an electromagnetic wave of very short wavelength. X-rays are polychromatic and have a larger spectrum than gamma rays. The power source for x-ray systems is electrical. This means it can be turned on and off. It also means that in a site where the electricity supply is not certain, it is essential to have a back-up generator. The energy level of x-ray systems is measured in mega-electron volts (MeV). The MeV rating varies in fixed, mobile and relocatable systems; these are discussed in detail below. X-ray systems are said to give better image quality but are more expensive and, in general, are physically larger than Gamma Ray systems.

#### b) Gamma Ray

Gamma rays are monochromatic electromagnetic waves of shorter wavelength than x-rays. Gamma rays are produced from natural isotopes such as Cesium-137 or Cobalt-60. These are radioactive sources and the energy emission is continuous. Because of this, the isotopes must be kept in a shielded cabinet at all times. Over time, the radioactive isotope's emission decreases. Accordingly, some Members that operate these systems have included within their contracts a provision for periodic testing to ensure that levels remain sufficiently high. Gamma ray systems are cheaper to purchase and to operate but the image produced are more difficult to interpret. A gamma ray unit is, in general, smaller than an x-ray unit which gives these systems a higher degree of mobility. Gamma ray units are far more likely to be mobile or relocatable than fixed. Live source needs to be disposed of and replaced approximately every 5 years.

The usual comparative method for these systems is to refer to the penetration ability through different thicknesses of steel. A gamma based system using a Cobalt-60 radioisotope, which has greater penetration than one based on Cesium-137, is said to penetrate up to 165mm of steel. Manufacturers of x-ray equipment show 180mm penetration of steel for a 2.5 MeV mobile x-ray system, over 200 mm for a 3.0 MeV mobile unit and more than 300mm for a 6.0MeV relocatable unit. Fixed x-ray systems of 9 MeV are able to penetrate around 400 mm of steel. Some currently deployed mobile systems have energy levels as low as 450kV and would have trouble surveying a large portion of container traffic. Members who currently use x-ray systems are of the view that 2.5 MeV is the minimum level for cargo penetration.



## **Type of system**

There are three mobility types of imaging systems available.

### **a) Fixed (Stationary)**

Fixed units are the most expensive and the most powerful, typically with energy levels around 9MeV. This high energy level provides a clearer image and deeper penetration of cargo than systems of lower energy. However, due to high energy of the system there is a possibility that x-rays may “blow through” the cargo without forming a proper image. Most fixed unit systems tend to be x-ray imaging units. A fixed unit may permit a “dual view”, that is both horizontal and vertical profiles of the cargo can be taken. Its site permanence allows for better links between the scanner’s computer system and the main Customs control network.

A fixed unit consists of more than just the scanner. Due to the high energy of the systems and possible scatter of x-rays the entire system must be housed in a purpose-built building with walls up to two meters or more deep. The building must also contain safety doors for the entrance and exit and can weigh 40 tonnes each. The entire construction of this unit must also include the facility for the computer equipment and image interpretation and may also include ancillary office accommodation. The system is quite expensive in terms of actual unit purchase including the facility that must be constructed to house it. Additionally, there is a need for an operating zone of a minimum of 3000 m<sup>2</sup>. Due to safety regulations in certain countries a total of 5,000–8,000m<sup>2</sup> for an operating zone may be necessary.

A major consideration for fixed units is that, by definition, containers must come to them. This means there must be sufficient space for vehicles waiting to enter the facility to park and to maneuver. Further, there must be satisfactory access roads to and from the unit that must accommodate both import and export traffic. Due to these constraints it has been found that fixed units are better suited to areas such as container ports where there is a constant flow of traffic which can be directed along a single channel or choke point.

Due to the fact that the purchase of a fixed unit may require purchase of land for the site and will involve substantial buildings to be erected, the process may take years from initial conception to final installation.

### **b) Relocatable**

Relocatable imaging/scanning units are designed to be a compromise between fixed and mobile systems by providing better performance than mobile units while overcoming the expense and land requirements of a fixed unit. Relocatable scanners typically operate at levels of approximately 6MeV and require a lighter infrastructure and shielding structure than fixed units. They are less expensive to purchase and operate than fixed units but must, as with a fixed unit, have suitable access roads and parking facilities. Relocatable units also require a dedicated and prepared operating area at each location that they are to be used.

While relocatable units may be dismantled and moved to a new location, they should not be considered as mobile units. The process of dismantling, transporting and reassembling them can be time-consuming and labour intensive. Although some low-energy gamma ray units may be relocatable in a day the move of a portable office could take longer. Higher

energy x-ray units, with more permanent support facilities require several days for the process. A relocatable unit may be the preferred choice if trade patterns indicate that traffic might move significantly from one port or border location to another in the foreseeable future. Due to cost and size implications some administrations have opted to deploy relocatable units in the same manner as a fixed unit with some modifications involving an upgrade of energy and penetration levels.

All relocatable x-ray and gamma ray scanning systems require a clear area surrounding them during operation for health and safety reasons and is known as an 'exclusion zone'. The space required for this zone increases in proportion with the increase in equipment energy levels. It is important to establish the land requirements of the exclusion zone for these relocatable units. If the necessary land is not available within the port or close to the Customs station, the scanning unit will have to be erected at a remote location.

#### c) Mobile (Portable)

Mobile units are less expensive than fixed units but operate at lower energy levels, typically around 2.5-4.0 MeV, although some models may be available up to 6 MeV. The reduced penetration levels of these units are offset by the mobility which allow for quick response by officers to address fast emerging risks. Prior to purchase a full review of the operation must be performed to make certain that the unit is fit for its function. Mobile scanners can take as little as 30 minutes to be ready for operation after its arrival on location. For example, they are particularly useful for land borders where traffic may cross at a number of points and smugglers are searching for the weak points in the border examination sites. The fact that they can move to different locations at a very short notice makes it more difficult for the smugglers to avoid scanning controls by shifting border entry points. They also permit the possibility of shared costs by neighbouring administrations who could jointly purchase and operate a mobile unit. Mobile systems are subject to greater downtime and require more frequent maintenance.

Unlike fixed and relocatable units mobile scanners do not require a network of access roads to be constructed because they are able to move to the traffic flow. However, like relocatable scanners, they do, require an 'exclusion zone' dependant upon the energy level and amount of shielding of the unit. Exclusion zones on the various models vary and must be specifically measured on a unit by unit basis. A rough estimate would be to assume that 500m<sup>2</sup> (1500m<sup>2</sup> required for 4 MeV systems) will be needed as an exclusion zone for these units. It is necessary to point out that the driver of a mobile scanning unit may also need a special license to move hazardous material on public roads and a special license to drive vehicles of a heavy weight class.

#### **IV. PURCHASING PROCESS <sup>(4)</sup>**

Every country has its own procurement procedure but some common guidelines can be established in order to ensure that the procurement process is transparent, fair and comprehensive.

##### ***The Request for Proposal (RFP)***

Whether the procurement approach is through a formal tendering process or a negotiating mode, the following documents must form the basis of the quotation to be made by vendors:

##### *Technical Request for Proposal*

- Detailed technical specifications
- Alternative/Options requests
- Minimum Performance expected from the systems
- Performance Test Procedure
- Maintenance Procedure and requirements

##### *Commercial Request for Proposal*

- Schedule of prices and delivery
- Schedule of prices for maintenance for one year and subsequent years
- Request for list of references of the bidder and of the systems offered
- Conditions of eligibility
- Request for Guarantees (Bid bond)
- Format of Contract, including format for guarantees to be issued by the contractor (performance bond, advance payment bond, Guarantee bond...)

##### ***Rules and procedures of the RFP***

The RFP must also present the rules and procedures of the acquisition process and define the following:

- Proposal documents
  - Content and format of bidding documents
  - Schedules to be filled
  - Clarification of bidding documents
  - Pre-bid meeting
  - Amendment of bidding document
  
- Preparation of Proposals
  - Language

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<sup>(4)</sup> See Annex – Sample bidding documents

- Documents comprising the Proposal
- Currency
- Bid security
- Period of validity of the Proposal
- Signing of the Proposal
  
- Submission of the Proposal
  - Sealing and marking
  - Deadline for submission
  - Late Proposals
  - Modification and withdrawal of Proposals
  
- Proposal opening and Evaluation
  - Opening of Proposal
  - Clarification of Proposal
  - Preliminary examination of Proposals
  - Conversion to single currency
  - Technical evaluation
  - Commercial evaluation
  - Domestic preference
  - Contacting the Customer
  
- Award of Contract
  - Post qualification
  - Award criteria
  - Notification of Award
  - Signing of Contract agreement
  - Performance securities

### ***The Proposal***

The proposals submitted must include at least the following documents:

#### *Technical proposal*

- Bid Form
- Executive summary showing vendor understanding of the request
- Technical offer as per the requested format
- Clause by clause approval of the Technical Specification, including appropriate comments showing capacity to fulfil each requirement
- Alternatives/option to the requested technical specification
- Preventive and corrective program, including MTBF and MTTR as well as the service organization which will be put in place in the country.

- Validated performance test results
- Company presentation

*Commercial proposal*

- Commercial offer as per the requested format
- Schedules of prices and delivery
- Schedules of prices for preventive and corrective maintenance
- Demonstration of eligibility
- List of references together with evidence (end user certificates, customer certificates)
- Financial guarantees (bid bond)
- Contract clause by clause approval/comments

***Technical evaluation (criteria, table of calculation)***

The offers must be evaluated using a table of evaluation which takes the following items into account:

- Overall completeness and compliance with the Technical Specification
- Company accumulated experience and background in the field
- Minimum acceptable standards (including compliance with national and international standards such as ISO, WHO)
- Achievement of performance criteria by the systems offered
- Time to deliver and commission
- Availability of the system for the duration of one year
- Responsiveness to preventive and corrective maintenance needs
- Organization to service the equipment on site
- Availability of spare parts in the long term
- Training facilities and organization
- Capacity to assist the Administration in its capacity building needs related to the equipments use

***Guidelines for a Contract***

The following items are to be included in a contract:

- Contract and Interpretation
  - Definitions of key words
  - Relationship between the parties
  - Language
  - Notices
  - Governing law
  - Settlement of disputes
- Subject Matter of the Contract

- Scope of the Contract
  - Time of commencement
  - Time of completion
  - Contractor's responsibilities
  - Employer's responsibilities
- Payment
    - Contract price
    - Currency
    - Terms of payment
    - Mode of payment
    - Securities
    - Taxes and duties
- Intellectual property
    - Copyright
    - Confidential information
- Execution of the Scope of the Contract
    - Work program
    - Schedule of delivery
    - Subcontracting
    - Design and engineering
    - Procurement
    - Installation
    - Specific regulations/law to install
    - Factory test and inspection
    - On-Site acceptance Test
    - Final completion certificates
- Guarantees and liabilities
    - Completion time guarantee
    - Penalty in case of late delivery
    - Penalty in case of late maintenance
    - Performance bond
    - Warranty guarantee
    - Patent indemnity
- Risk distribution
    - Transfer of ownership
    - Care of facilities

- Loss & Damage to property
  - Accident or injury to workers
  - Insurance
  - Force Majeure
- Change in Contract elements
    - Extension of Time for completion
    - Termination
    - Assignment

The following documents may be annexed to the Contract:

- Detailed Technical Specification approved by the vendor
- Drawings and any other technical document defining, in detail, the scope of work of the Contract
- Detailed maintenance and warranty program
- Factory test acceptance procedure
- On-site acceptance test procedure
- Price Schedules
- Security bond

Consider

- Separate contracts for supply of system and for maintenance
- Extended warranty provisions
- For mobile systems ensure both x-ray unit and vehicle chassis are covered by maintenance and warranty provisions
- Service level agreements

Immediately after contract award, the vendor and the training department of Customs administration start the development of the following training courses:

- Basic radiation safety training (1/2 – 1 day)
- Basic operator training (2 – 4 days)
- Comprehensive training (2 - 3 weeks) First week: radiation awareness and basic operator training. Second week: image enhancement and analysis, including problem solving (breakdowns). Third week training depends on the complexity of the system.

Manufacturing process

The various stages of manufacture should be monitored, including progress reports being submitted

## **V. FACTORY ACCEPTANCE TEST**

Imaging system tested to contractual specifications at the manufacturer's site.

Confirmation of the claimed exclusion zone.

These tests should be drawn up carefully and agreed with supplier in advance.

### ***Shipping***

Insure that adequate marine (other) insurance is in place.

Insure that responsibility for customs clearance procedures and payment of customs duties/other taxes is clearly defined.

## **VI. DEPLOYMENT**

Factors to be taken into account:

- Transportation requirements (e.g. Radioactive isotopes) for the safe transportation of the system across the country
- Environmental/Wildlife assessment requirements may be taken into account
- Computer system compatibility issues should be taken into account – codes, data protocols, infrastructure/architecture, etc. (existing computer system of the customs administration vs. system of the equipment in question)
- IAEA standards / National standards:
- Daily/annual maximum allowances
- Suggested exposure dosage is 5 microSieverts (microSv) per hour for exclusion zone. Maximum limit for general public should not exceed 1 mSv per year
- Measuring the exclusion zone (done by radiation specialists) - Original determination is made by radiation specialists, then by trained officials
- Second site survey must be completed with contracted vendor



Training courses which were developed after the award of the contract are reviewed for sufficiency and must be approved prior to the Field Validation Test.

## **VII. FIELD VALIDATION TEST**

After installation imaging system has to be tested to contractual specifications at the purchaser's site by a specialized customs team who is familiar with these systems and test regimes. Due to varying conditions of the site, systems may not perform in the same manner as they did during factory acceptance testing. Additional modifications may be required to fully meet the specifications of the contract. In this case "a cure notice" will be issued to the manufacturer notifying him of the deficiencies identified in the course of the Field Validation Test.

When Field Validation Test phase is initiated, the training courses previously developed and approved by the Customs administrations are rolled out to the operators of the equipment.

## **VIII. ACCEPTANCE**

If the systems are tested and meet the specifications of the contract, then the contracting unit may approve formal acceptance of the equipment according to relevant national requirements.

## **IX. POST IMPLEMENTATION REVIEW**

Immediately after the system is installed, discuss with imaging equipment operators:

- Concept of operations (explanation of how the imaging equipment fits into the operation of that site);
- Standard operation procedures (Step by step description of how the equipment is to be operated)
- System optimization
- Sufficiency of the training
- Operational support (establishing link with maintenance support; establishing spare parts inventory or accessibility to spare parts)

Regular long term review (annually):

- Discussion with imaging equipment operators for deficiencies and shortfalls in expected performance and amendments to standard operating procedures, if needed
- Additional training needs (Refresher training should be organized on a regular basis for all users of the imaging equipment). Generally the training courses provided by the suppliers are fairly basic especially in the area of image interpretation. Advanced image interpretation training has been found to be beneficial, especially when provided after the operators have had some months experience of the system.

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## **X. ANNEX: SAMPLE BIDDING DOCUMENT**

EC

## “The Bidding Document”

**Zambia National Tender Board**



**Government of the Republic of Zambia**

### **Bidding document**

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TB/ORD/0.../07

Tender for the supply, delivery, installation, commissioning, operation and maintenance of container scanners

Zambia Revenue Authority

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Funding Agency: Zambia Revenue Authority

Zambia National Tender Board  
Red Cross House  
Los Angeles Boulevard, LUSAKA

August 2007

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## ***Section II. Instructions to Bidders***

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Can be obtained by contacting the WCO at: [Capacity.building@wcoomd.org](mailto:Capacity.building@wcoomd.org)

## ***Section III. Bid Data Sheet***

## ***Section IV. General Conditions of Contract***

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## ***Section V. Special Conditions of Contract***

Can be obtained by contacting the WCO at: [Capacity.building@wcoomd.org](mailto:Capacity.building@wcoomd.org)

## ***Section VI. Technical Specifications***

## ***Section VII. Sample Forms and Procedures***

1. Bid Forms and Price Schedule
2. Form of Bid Security (Bank Guarantee)
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4. Bank Guarantee Form for Advance Payment
5. Form of Completion Certificate
6. Form of Operational Acceptance Certificate

## Section I. Invitation for Bids

TB/ORD/0.../07: Tender for the supply, delivery, installation and commissioning of container scanners

1. The Zambia National Tender Board on behalf of the Zambia Revenue Authority invites sealed bids from eligible Bidders for the supply, delivery, installation, operation and commissioning of container scanners as follows:

S/N	Item Description	Quantity	Delivery Period
	Mobile scanners	xx	xx Weeks

2. Bidders must quote for all the quantities to be treated as substantially responsive. Bids not offering full quantities shall be considered non responsive and shall be rejected.
3. Interested eligible Bidders may obtain further information from the Zambia National Tender Board and inspect the bidding documents at the address given below from 08:00 to 13:00 hrs and from 14:00 to 17:00 hours.
4. A complete set of bidding documents in English may be purchased by interested Bidders from the Zambia National Tender Board at the address given below upon payment of a non-refundable fee of MK1,000,000.00 or its equivalent in any freely convertible currency at the prevailing exchange rate in cash or by bank certified cheque.
5. Bids should be sent clearly marked "Tender for the Supply, Delivery, Installation and Commissioning of Container Scanners – Zambia Revenue Authority" and addressed to the Director General, Zambia National Tender Board and must be received not later than Friday..... 2007 at 14:00 hours local time.
6. Sealed bids must be deposited in the Tender Box at the Zambia National Tender Board Offices, 2nd Floor, Red Cross House, Corner Los Angeles Boulevard and Kumoyo Rd, Longacres, Lusaka on or before Friday, ..... 2007 at 14:00hrs local time. All bids must be accompanied by a Bid Security of not less than two (2%) percent of the Bid Sum duly signed by the Guarantor(s). Late bids will be rejected. Bids will be opened soon after closing in the Conference Room on the 2nd Floor, Red Cross House in the presence of Bidders' representatives who choose to attend.

Mr. D. Kapitolo  
 Director General  
 Zambia National Tender Board  
 Red Cross House,  
 Corner of Los Angeles Boulevard and Kumoyo Rd  
 Longacres  
 P.O. Box 31009,  
 Lusaka, Zambia.

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15. Copyright
16. Confidential Information

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22. Installation
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32. Insurance
33. Force Majeure

#### **H. Change in Contract Elements**

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## Section VI. Technical Specifications and Drawings

### A. Mobile scanners

#### 1 General

- 1.1
- 1.2
- 1.3

#### 2 Requirements in general

- 2.1
- 2.2
- 2.3

#### 3 Requirements for X-RAY emission unit

- 3.1
- 3.2
- 3.3

#### 4 Requirements for radiation safety

- 4.1
- 4.2
- 4.3

#### 5 Requirements for control

- 5.1
- 5.2
- 5.3

#### 6 Requirements for detection

- 6.1
- 6.2
- 6.3

#### 7 Requirements for computer system

- 7.1
- 7.2
- 7.3

#### 8 Requirements for vehicle

- 8.1
- 8.2
- 8.3

#### 9 Requirements for system mobility

- 9.1
- 9.2
- 9.3

#### 10 Requirements for training and documentation

- 10.1
- 10.2
- 10.3

11 Requirements for technical tests & commissioning

- 11.1
- 11.2
- 11.3

12 Standards and quality

- 12.1
- 12.2
- 12.3

**B. Operation and Maintenance**

During the first 12 months after the completion of the facilities, the Contractor will provide full service to the scanners as follows:

1. System operation
2. Preventive Maintenance
3. Corrective Maintenance
4. Penalties
5. Assistance with system integration

## **Section VII. Sample Forms**

### **Table of Sample Forms**

1. Bid Form and Price Schedule
2. Form of Bid Security (Bank Guarantee)
3. Form of Contract
4. Performance Security Forms
5. Bank Guarantee Form for Advance Payment
6. Form of Completion Certificate
7. Form of Operational Acceptance Certificate

# 1. Bid Form and Price Schedule

## 1.1 Bid Form

Date: \_\_\_\_\_  
IFB No: \_\_\_\_\_

*[Name of Contract]*

To: *[Name and address of Client]*

Ladies and/or Gentlemen,

Having examined the bidding documents, including Addenda Nos. **[insert numbers]**, the receipt of which is hereby acknowledged, we, the undersigned, offer to design, manufacture, test, deliver, install, commission, operate and maintain the facilities under the above-named Contract in full conformity with the said bidding documents for the sum of: **[amount of foreign currency in words]**, **[amount in figures]**, and **[amount of local currency in words]**, **[amount in figures]** or other such sums as may be determined in accordance with the terms and conditions of the Contract. The above amounts are in accordance with the Price Schedules attached hereto and are made part of this bid.

We undertake, if our bid is accepted, to commence the facilities and to achieve completion within the respective times stated in the bidding documents.

If our bid is accepted, we undertake to provide an advance payment security and a performance security in the form, in the amounts and within the times specified in the bidding documents.

We agree to abide by this bid, which consists of this letter and Attachments 1 through **[number]** hereto, for a period of 90 days from the date fixed for submission of bids as stipulated in the bidding documents, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until a formal contract is prepared and executed between us, this bid, together with your written acceptance thereof and your notification of award shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest or any bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

\_\_\_\_\_  
[signature]

In the capacity of \_\_\_\_\_  
[position]

Duly authorized to sign this bid for and on behalf of \_\_\_\_\_  
[name of Bidder]

## 1.2 Price Schedule

Preamble

General

1. The Price Schedules are divided into separate Schedules as follows:

- Schedule No. 1 Plant and Equipment (including Mandatory Spare Parts) supplied from Abroad
- Schedule No. 2 Plant and Equipment (including Mandatory Spare Parts) supplied from within the Client's Country
- Schedule No. 3 Local Transportation
- Schedule No. 4 Installation Services
- Schedule No. 5 Grand Summary
- Schedule No. 6 Recommended Spare Parts

*Add any other Schedules as appropriate*

2. The Schedules do not generally give a full description of the plant and equipment to be supplied and the services to be performed under each item. Bidders shall be deemed to have read the Technical Specifications and other sections of the bidding documents and reviewed the Drawings to ascertain the full scope of the requirements included in each item prior to filling in the rates and prices. The entered rates and prices shall be deemed to include for the full scope as aforesaid, including overheads and profit.
3. If Bidders are unclear or uncertain as to the scope of any item, they shall seek clarification in accordance with the Instructions to Bidders in the bidding documents prior to submitting their bid.

Pricing

4. Prices shall be filled in indelible ink, and any alterations necessary due to errors, etc., shall be initialed by the Bidder.
5. Bid prices shall be quoted in the manner indicated and in the currencies specified in the Instructions to Bidders in the bidding documents.

Prices given in the Schedules against each item shall be for the scope covered by that item as detailed in the Technical Specifications, Drawings or elsewhere in the bidding documents.

6. Where there are discrepancies between the total of the amounts given under the column for the price breakdown and the amount given under the Total Price, the former shall prevail and the latter will be corrected accordingly.

Where there are discrepancies between the total of the amounts of Schedule Nos. 1 to 4 and the amount given in Schedule No. 5 (Grand Summary), the former shall prevail and the latter will be corrected accordingly.

Where there are discrepancies between amounts stated in figures and amounts stated in words, the amounts stated in words shall prevail.

7. Payments will be made to the Contractor in the currency or currencies indicated under each respective item.
8. Items left blank will be deemed to have been included in other items. The TOTAL for each Schedule and the TOTAL of the Grand Summary shall be deemed to be the total price for executing the facilities and sections thereof in complete accordance with the Contract, whether or not each individual item has been priced.
9. When requested by the Client for the purposes of making payments or part payments, valuing variations or evaluating claims, or for such other purposes as the Client may reasonably require, the Contractor shall provide the Client with a breakdown of any composite or lump sum items included in the Schedules.

## Schedules of Rates and Prices

### Schedule No. 1. Plant, Equipment, and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code	Qty.	Unit Price	Total Price
				CIP	
			(1)	(2)	(1) x (2)
Total (to Schedule No. 5 Grand Summary)					

Code	Country

Name of Bidder
Signature of Bidder

### Schedule No. 2. Local Transportation, Insurance and Other Incidental Services

Item	Description	Qty.	Unit Price <sup>1</sup>	Total Price <sup>1</sup>
			Local Currency Portion	
		(1)	(2)	(1) x (2)
Total (to Schedule No. 5 Grand Summary)				

Code	Country

Name of Bidder
Signature of Bidder

**Note:** This Schedule will only cover items in Schedule No.2. Since the named place of destination is the project site, the transportation costs for Schedule No. 1 items are covered under CIP and therefore should not be stated here.

**Schedule No. 3. Installation, Commissioning and Training Services**

Item	Description	Qty.	Unit Price		Total Price	
			Foreign Currency Portion	Local Currency Portion	Foreign	Local
		(1)	(2)	(3)	(1) x (2)	(1) x (3)
Total (to Schedule No. 5 Grand Summary)						

Name of Bidder
Signature of Bidder

**Schedule No. 4. Maintenance and operation services for 1 year (including Mandatory Spare Parts)**

Item	Description	Qty.	Unit Price		Total Price	
			Foreign Currency Portion	Local Currency Portion	Foreign	Local
		(1)	(2)	(3)	(1) x (2)	(1) x (3)
Total (to Schedule No. 5 Grand Summary)						

Name of Bidder
Signature of Bidder

**Schedule No. 5. Grand Summary**

Item	Description	Total Price	
		Foreign	Local
	Total Schedule No. 1.		
	Total Schedule No. 2.		
	Total Schedule No. 3.		
	Total Schedule No. 4.		
<b>TOTAL (to Bid Form)</b>			

Name of Bidder
Signature of Bidder

**Schedule No. 6. Recommended Spare Parts**

Item	Description	Qty.	Unit Price		Total Price
			CIP (foreign parts)	EXW (local parts)	
		(1)	(2)	(3)	(1) x (2) or(3)

Name of Bidder
Signature of Bidder





## 2. Form of Bid Security (Bank Guarantee)

\_\_\_\_\_

[Bank's name and address of issuing Branch or Office]

Beneficiary: \_\_\_\_\_ [Name and address of Client]

Date: \_\_\_\_\_

BID GUARANTEE No.: \_\_\_\_\_

We have been informed that [name of the Bidder] (hereinafter called "the Bidder") has submitted to you its bid dated (hereinafter called "the Bid") for the execution of [name of contract] under Invitation for Bids No. [IFB number] ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] ([amount in words]) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

- (a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Bid Form; or
- (b) having been notified of the acceptance of its bid by the Client during the period of bid validity, (i) fails or refuses to execute the Contract Form, if required, or (ii) fails or refuses to furnish the performance security, in accordance with the Instructions to Bidders.

This guarantee will expire:

- (a) if the Bidder is the successful bidder, upon our receipt of copies of the Contract signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; or
- (b) if the Bidder is not the successful bidder, upon:
  - (1) our receipt of a copy of your notification to the Bidder of the name of the successful bidder; or
  - (2) twenty-eight days after the expiration of the Bidder's Bid;

Whichever is earlier.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

\_\_\_\_\_

[signature(s)]

### 3. Form of Contract Agreement

THIS CONTRACT AGREEMENT is made the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_ .

BETWEEN

(1) **[Name of Client]**, a statutory body established under the Zambia Revenue Authority Act Chapter 321 of the Laws of Zambia and having its principal place of business at Revenue House, Kabwe Roundabout, Lusaka (hereinafter called "the Client"), and (2) **[name of Contractor]**, a corporation incorporated under the Laws of [country of Contractor] and having its principal place of business at **[address of Contractor]** (hereinafter called "the Contractor").

WHEREAS the Client desires to engage the Contractor to design, manufacture, test, deliver, install, complete and commission certain facilities, viz. *[list of facilities]* ("the facilities") and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

#### Article 1. Contract Documents

##### 1.1 Contract Documents

The following documents shall constitute the Contract between the Client and the Contractor, and each shall be read and construed as an integral part of the Contract:

- (a) This Contract and the Appendixes attached hereto;
- (b) Bid and Price Schedules submitted by the Contractor;
- (c) Special Conditions of Contract;
- (d) General Conditions of Contract;
- (e) Technical Specifications and Drawings;
- (f) (f) Procedures (as listed); and
- (g) Any other documents.

##### 1.2 Order of Precedence

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

##### 1.3 Definitions (Reference GCC Clause 1)

Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract.

#### Article 2. Contract Price and Terms of Payment

##### 2.1 Contract Price (Reference GCC Clause 11)

The Client hereby agrees to pay to the Contractor the contract price in consideration of the performance, by the Contractor, of its obligations hereunder. The contract price shall be the aggregate of: [amount of foreign currency in words], [amount in figures] as specified in Price Schedule No. 5 (Grand Summary), and [amount of local currency in words], [amount in figures], or such other sums as may be determined in accordance with the terms and conditions of this Contract.

## 2.2 Terms of Payment (Reference GCC Clause 12)

The terms and procedures of payment according to which the Client will reimburse the Contractor shall be as follows:

For Schedule No. 1 and Schedule No. 2

- (1) Ninety (90%) of the cost for Schedule 1 and Schedule 2 shall be paid through an irrevocable confirmed letter of credit opened in favour of the Contractor in a bank in its country, upon submission of the following documents:
  - Three (3No.) Originals and two (2No.) copies of the Contractor's invoice showing Goods' description, quantity, unit price, and total amount;
  - Original and two (2No.) copies of the negotiable, clean, on-board bill of lading marked "freight prepaid" and two (2No.) copies of the non negotiable bill of lading;
  - Two (2No.) copies of the packing list identifying the contents of each package;
  - Insurance certificate;
  - Manufacturer's or Contractor's warranty certificate; and
  - A Factory Operational Acceptance Certificate.
- (2) Ten (10%) percent of the cost for Schedule 1 and Schedule 2 shall be paid within thirty (30) days of receipt of the Goods upon submission of claim supported by the acceptance certificate issued by the Client.

For Schedule No. 3

- (1) Ninety percent of the cost shall be paid prior to commencement of the installation, commissioning and training upon presentation of a claim by the Supplier.
- (2) Ten percent of the cost shall be paid within thirty days of completion of installation, commissioning and training upon presentation of a claim supported by the completion certificate.

For Schedule No. 4

Payments shall be made within 30 days of presentation of an invoice after the services have been provided.

In the event that the Contractor demands an advance payment, it shall not exceed 10% of the cost and shall only apply to Schedules Nos. 1 to 3. The Contractor shall be required to provide an advance payment guarantee to the sum of the advance payment being claimed.

## **Article 3. Effective Date for Determining Time of Completion**

### *3.1 Effective Date (Reference GCC Clause 1)*

The time of completion of the facilities shall be determined from the date when all of the following conditions have been fulfilled:

- (a) this Contract has been duly executed for and on behalf of the Client and the Contractor;
- (b) the Contractor has submitted to the Client the performance security and the advance payment guarantee;
- (c) the Client has paid the Contractor the advance payment; and
- (d) the Contractor has been advised that the documentary credit referred to in Article 2.2 above has been issued in its favour.

Each Party shall use its best efforts to fulfil the above conditions for which it is responsible as soon as practicable.

3.2

If the conditions listed under 3.1 are not fulfilled within two (2) months from the date of this Contract notification because of reasons not attributable to the Contractor, the Parties shall discuss and agree on an equitable adjustment to the contract price and the time for completion and/or other relevant conditions of the Contract.

**Article 4. Appendices**

4.1

The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract.

4.2

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Client and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the Client

\_\_\_\_\_  
[Signature]

\_\_\_\_\_  
[Title]

in the presence of \_\_\_\_\_

Signed by, for and on behalf of the Contractor

\_\_\_\_\_  
[Signature]

\_\_\_\_\_  
[Title]

in the presence of \_\_\_\_\_

#### 4. Performance Security Guarantee

\_\_\_\_\_ [Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: \_\_\_\_\_ [Name and Address of Client]

Date: \_\_\_\_\_

PERFORMANCE GUARANTEE No.: \_\_\_\_\_

We have been informed that [name of Contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated \_\_\_\_\_ with you, for the execution of [name of contract and brief description of Facilities] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] (\_\_\_\_) [amount in words]<sup>(1)</sup>, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall be reduced by half upon our receipt of:

- (a) a copy of the Operational Acceptance Certificate; or
- (b) a registered letter from the Contractor:
  - (i) attaching a copy of its notice requesting issuance of the Operational Acceptance Certificate; and
  - (ii) stating that the Project Manager has failed to issue such a Certificate within the time required or provide in writing justifiable reasons why such a Certificate has not been issued, so that Operational Acceptance is deemed to have occurred.

This guarantee shall expire no later than the earlier of:

- (a) twelve months after our receipt of either (a) or (b) above; or
- (b) eighteen months after our receipt of:
  - (1) a copy of the Completion Certificate; or
  - (2) a registered letter from the Contractor, attaching a copy of the notice to the Project Manager that the facilities are ready for commissioning, and stating that fourteen days have elapsed from the receipt of such notice (or seven days have elapsed if the notice was a repeat notice) and the Project Manager has failed to issue a Completion Certificate or inform the Contractor in writing of any defects or deficiencies; or
  - (3) a registered letter from the Contractor stating that no Completion Certificate has been issued but that the Client is making use of the facilities; or
- (c) the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.

\_\_\_\_\_  
[signature(s)]

(1) The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Employer.

**5. Bank Guarantee Form for Advance Payment**

[Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: [Name and Address of Client]

Date: \_\_\_\_\_

ADVANCE PAYMENT GUARANTEE No.: \_\_\_\_\_

We have been informed that [name of Contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [name of contract and brief description of Facilities] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum [amount in figures] (\_\_\_\_) [amount in words] is to be made against an advance payment guarantee.

At the request of the Contractor, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] (\_\_\_\_) [amount in words] upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than towards the execution of the works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor via his or her account number \_\_\_\_\_ at [name and address of Bank].

The maximum amount of this guarantee shall be progressively reduced in proportion to the value of each part-shipment or part-delivery of plant and equipment to the site, as indicated in copies of the relevant shipping and delivery documents that shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of documentation indicating full repayment by the Contractor of the amount of the advance payment, or on the \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_\_, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

\_\_\_\_\_  
[signature(s)]

**6. Form of Completion Certificate**

Date: \_\_\_\_\_  
Loan/Credit No: \_\_\_\_\_  
IFB No: \_\_\_\_\_

[Name of Contract]

To: [Name and address of Contractor]

Dear Ladies and/or Gentlemen,

Pursuant to GCC Clause 24 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Client dated [date], relating to the [brief description of the Facilities], we hereby notify you that the following part(s) of the facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Client hereby takes over the said part(s) of the facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below.

1. Description of the facilities or part thereof: [description]
2. Date of completion: [date]

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

\_\_\_\_\_  
Title  
(Project Manager)



**7. Form of Operational Acceptance Certificate**

Date: \_\_\_\_\_  
Loan/Credit No: \_\_\_\_\_  
IFB No: \_\_\_\_\_

[Name of Contract]

To: [Name and address of Contractor]

Dear Ladies and/or Gentlemen,

Pursuant to GCC Sub-Clause 25.3 (Operational Acceptance) of the General Conditions of the Contract entered into between yourselves and the Client dated [date], relating to the [brief description of the facilities], we hereby notify you that the Functional Guarantees of the following part(s) of the facilities were satisfactorily attained on the date specified below.

1. Description of the facilities or part thereof: [description]
2. Date of Operational Acceptance: [date]

This letter does not relieve you of your obligation to complete the execution of the facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

\_\_\_\_\_  
Title  
(Project Manager)

\_\_\_\_\_